



## NOTA TEKNIKAL

### 1. OBJEKTIF

Objektif utama penerbitan ini ialah untuk menyediakan statistik aliran terkini bagi indikator utama di sektor Pembuatan, iaitu statistik **nilai jualan, bilangan pekerja bergaji, gaji & upah** serta **pengeluaran produk utama** yang dipungut melalui Survei Pembuatan Bulanan. Statistik ini membantu pengguna dalam merangka dasar serta membuat keputusan.

### 2. PENANDA ARASAN

Selepas melaksanakan Banci Ekonomi 2016 (tahun rujukan 2015), Jabatan Perangkaan Malaysia (DOSM) telah mengkaji dan melaksanakan proses penanda arasan terhadap statistik pembuatan yang dipungut melalui Survei Pembuatan Bulanan. Proses penanda arasan ini membolehkan siri nilai anggaran tahunan yang dijana menerusi statistik jangka pendek konsisten dengan nilai tahunan daripada banci/survei tahunan sebagai tahun penanda aras. Penanda arasan yang dibuat berpandukan *Quarterly National Accounts Manual 2017 edition, International Monetary Fund* bagi mencapai objektif seperti berikut:

- a. Menganggarkan data bulanan supaya konsisten dengan data tahunan iaitu, untuk memastikan jumlah data bulanan adalah sama dengan penanda aras tahunan;
- b. Memelihara sebanyak mungkin pertumbuhan indikator bulanan semasa proses penanda arasan tahunan dibuat; dan
- c. Memastikan data siri ke hadapan, jumlah data bulanan bagi tahun semasa sedekat mungkin dengan data tahunan yang diperoleh semasa banci atau survei tahunan yang dijalankan.

Statistik penanda arasan disusun bagi nilai jualan, bilangan pekerja bergaji dan gaji & upah sektor Pembuatan dan diterbitkan mulai Januari 2020. Tahun asas (penanda aras) adalah menggunakan Banci Ekonomi 2016 (tahun rujukan 2015) sebagai tahun penanda aras dan kaedah *pro rata* dan *extrapolation* digunakan dalam proses penanda arasan ini.

#### Kaedah *pro rata*:

$$M^iV = \frac{M^iI}{\sum_{i=1}^{12} M^iI} \times ADT$$

di mana

$M^iV$  = pemboleh ubah anggaran bulanan yang dinaik aras

$M^iI$  = siri indikator bulanan

$ADT$  = data tahunan tahun asas (penanda aras)

#### Kaedah *extrapolation*:

$$V_t = V_{t-1} * G_{t-1,t}$$

di mana

$V_t$  = nilai pemboleh ubah

$G_{t-1,t}$  = pertumbuhan daripada t-1 kepada t



### 3. SKOP DAN LIPUTAN

Data yang dipungut dalam Survei Pembuatan Bulanan meliputi seluruh Malaysia. Mulai Januari 2020, penerbitan ini memaparkan statistik berwajaran yang menggambarkan populasi sampel bagi 251 industri dalam sektor Pembuatan.

Data bagi industri yang mempunyai perwakilan kurang daripada tiga pertubuhan telah digabungkan kepada industri terhampir bagi memelihara kerahsiaan responden seperti mana yang termaktub dalam Akta Perangkaan 1965 (Disemak - 1989).

### 4. SUMBER RANGKA

Sumber rangka ialah daripada *Malaysia Statistical Business Register (MSBR)* di mana maklumat utama diperolehi daripada banci dan survei yang dilaksanakan oleh Jabatan Perangkaan Malaysia (DOSM) serta data pentadbiran. Sumber utama data pentadbiran tersebut adalah daripada Suruhanjaya Syarikat Malaysia (SSM). Selain itu, DOSM juga turut bekerjasama mendapatkan maklumat daripada lebih 50 agensi lain seperti Kumpulan Wang Simpanan Pekerja (KWSP), Jabatan Kastam Diraja Malaysia (JKDM), Lembaga Hasil Dalam Negeri (LHDN), Pihak Berkuasa Tempatan (PBT) serta Badan-badan Profesional. Rangka dikemaskini secara berterusan dengan mengambil kira pertubuhan baru dan merekod sebarang perubahan dalam status pertubuhan seperti tutup, tidak beroperasi, perubahan jenis aktiviti dan lokasi atau alamat pos untuk memastikan maklumat yang terdapat dalam rangka adalah yang paling terkini.

### 5. JENIS AKTIVITI PERNIAGAAN

Jenis aktiviti perniagaan merujuk kepada aktiviti utama dan sekunder. Aktiviti utama merujuk kepada aktiviti yang mana pertubuhan menumpukan sebahagian besar sumbernya atau memberi sumbangan besar dari segi pendapatan. Aktiviti sekunder didefinisikan sebagai aktiviti sampingan kepada aktiviti utama. Klasifikasi bagi pertubuhan adalah berasaskan kepada aktiviti utama dan Piawaian Klasifikasi Industri Malaysia (MSIC 2008) Versi 1.0. yang diselaraskan dengan *International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4, United Nations* dengan pengubahsuaian mengikut keperluan tempatan.

### 6. KONSEP DAN DEFINISI

Konsep dan definisi yang digunakan selari dengan manual *International Recommendations for Industrial Statistics 2008, United Nations Statistics Division*. Takrif pembuatan yang digunakan dalam survei ini adalah selaras dengan Piawaian Klasifikasi Industri Malaysia (MSIC) 2008 Versi 1.0.

Pembuatan ditakrifkan sebagai perubahan fizikal atau kimia ke atas bahan atau komponen menjadi produk baru sama ada kerja itu dilakukan oleh jentera yang dijalankan oleh kuasa atau yang dijalankan dengan tangan, sama ada dijalankan dalam kilang atau di rumah pekerja, dan sama ada barang keluaran dijual secara borong atau runcit.





## 7. REKA BENTUK PENSAMPELAN

Reka bentuk pensampelan bagi survei ini adalah pensampelan rawak strata satu peringkat. Pertubuhan dikelaskan sebagai unit pensampelan manakala beberapa kategori strata telah dikenalpasti.

Setiap strata telah dibentuk kepada tiga substrata untuk memastikan sampel yang diagihkan mengambil kira ciri-ciri ekonomi strata tersebut. Substrata utama bersifat heterogen dan diliputi secara penuh. Manakala, substrata selainnya yang bersifat homogen disampelkan.

Substrata utama meliputi pertubuhan kategori besar dan yang mempunyai jumlah hasil yang signifikan dalam industri berkaitan manakala bagi substrata kedua dan ketiga berdasarkan kategori perusahaan kecil dan sederhana (PKS).

## 8. SAIZ SAMPEL

Statistik utama yang digunakan untuk penganggaran saiz sampel adalah nilai jualan. Formula yang digunakan dalam penganggaran saiz sampel bagi strata adalah seperti berikut:

$$n = \frac{(\sum N_i S_i)^2}{V + \sum N_i S_i^2}$$

di mana;

$n$  = Saiz sampel

$N_i$  = Saiz populasi bagi strata  $i$

$S_i^2$  = Varian bagi strata  $i$

$V$  = Varian sasaran

$$V = RSE^2 \cdot \left( \frac{\hat{Y}_i}{Z} \right)^2$$

di mana;

$\hat{Y}_i$  = Jumlah nilai jualan bagi strata

$RSE$  = Ralat piawai relatif

$Z$  = Nilai aras keyakinan

Sampel akan diagihkan kepada substrata dalam industri liputan dengan menggunakan kaedah *Neyman Allocation* seperti berikut:

$$n_{hi} = \left( \frac{N_h S_h}{\sum N_h S_h} \right) n_i'$$

$h$  = 2, 3 dan 4

$i$  = 1, 2, ...  $k$





di mana;

$n_{hi}$  = Saiz sampel bagi substrata  $h$  dalam strata  $i$

$N_h$  = Saiz populasi bagi substrata  $h$

$S_h$  = Sisihan piawai bagi substrata  $h$

$n_i$  = Saiz sampel bagi strata  $i$

$h$  = Substrata

$i$  = Strata

Pertubuhan kategori substrata utama diliputi sepenuhnya, manakala pertubuhan bagi substrata kedua dan ketiga dipilih secara rawak mengikut kaedah pensampelan bersistematik.

## 9. WAJARAN

Analisis berwajaran disediakan menggunakan wajaran sampel bagi memastikan sampel yang dipilih dapat menggambarkan populasi survei. Wajaran yang diperlukan adalah wajaran di peringkat reka bentuk pensampelan dan tiada respons.

Wajaran reka bentuk pensampelan pada substrata  $h$  adalah seperti berikut :

$$W_h = \frac{N_h}{n_h}, \quad h=1, \dots, 4$$

di mana;

$N_h$  = Bilangan populasi bagi substrata  $h$  ; dan

$n_h$  = Bilangan sampel bagi substrata  $h$





Wajaran tiada respons pada substrata  $h$  adalah seperti berikut :

$$NRW_h = \frac{1}{\frac{n'_h}{n_h}} \quad h = 1, \dots, 4$$

di mana;

$$n'_h = \text{Bilangan sampel respons bagi substrata } h$$

$$n_h = \text{Bilangan sampel bagi substrata } h$$

Kaedah pengiraan wajaran reka bentuk pensampelan selepas survei (*adjusted weight*) pada substrata  $h$  seperti berikut:

$$W'_h = W_h \times NRW_h, \quad h = 1, \dots, 4$$

di mana;

$$W_h = \text{Wajaran reka bentuk pensampelan pada substrata } h$$

$$NRW_h = \text{Wajaran tiada respons pada substrata } h$$

## 10. UNIT MELAPOR

Unit melapor bagi survei ini ialah **pertubuhan**. Sesebuah pertubuhan ditakrifkan sebagai "satu unit ekonomi yang bergiat di bawah satu hak milik atau penguasaan tunggal, iaitu di bawah satu entiti yang sah. Ia menjalankan satu jenis aktiviti ekonomi utama di satu tempat / lokasi fizikal". Setiap pertubuhan diberikan klasifikasi industri berdasarkan aktiviti utamanya. Bagi pertubuhan yang menjalankan pelbagai aktiviti, unit yang bergiat dalam aktiviti yang berasingan dalam satu lokasi yang sama adalah terdiri daripada entiti pertubuhan yang berbeza. Oleh itu, setiap cawangan daripada organisasi yang mempunyai pelbagai cawangan di lokasi yang berbeza dari segi konsep dianggap sebagai pertubuhan yang berlainan. Pertubuhan berkenaan diminta memberikan penyata yang berasingan bagi setiap kegiatannya dari segi nilai. Walau bagaimanapun, dari segi praktisnya akaun biasanya disediakan secara berpusat kerana kesukaran untuk memperoleh data yang berasingan bagi setiap unit atau cawangan. Entiti atau enterpris ini akan dianggap sebagai satu unit pelapor dan dibenarkan mengemukakan soal selidik yang menggabungkan semua unit atau cawangannya.





## 11. NILAI JUALAN

Nilai jualan yang dilaporkan merujuk kepada nilai jualan produk sendiri sahaja. Ini bermaksud jualan produk yang berlaku dalam bulan laporan, sama ada produk tersebut telah dibuat/dihasilkan oleh pertubuhan pada bulan tersebut atau bulan-bulan sebelumnya. Nilai jualan adalah berdasarkan kepada nilai bersih di kilang dan berkaitan dengan kuantiti yang dijual. Penilaian harga yang dikenakan kepada pelanggan adalah tidak termasuk:

- a. diskaun atau rebat;
- b. bayaran untuk pengangkutan keluar;
- c. komisen kepada wakil-wakil penjual;
- d. bayaran lain seperti cukai eksais yang dibayar atau cukai jualan yang dipungut oleh kilang bagi pihak kerajaan; dan
- e. bayaran pemasangan, pembaikan dan pembinaan

## 12. BILANGAN PEKERJA BERGAJI

Bilangan pekerja bergaji meliputi seperti berikut:

- a. Pekerja bergaji (sepenuh masa) - Merujuk kepada semua pekerja bergaji yang bekerja sekurang-kurangnya 6 jam sehari dan sekurang-kurangnya 20 hari sebulan; dan
- b. Pekerja bergaji (sambilan) - Merujuk kepada semua pekerja bergaji yang bekerja kurang daripada 6 jam sehari dan/atau kurang daripada 20 hari sebulan.

## 13. GAJI & UPAH DIBAYAR

Gaji & upah yang dibayar merujuk kepada semua bayaran tunai, termasuk bonus, komisen, bayaran lebih masa, elaun kos sara hidup dan elaun lain yang dibayar kepada semua pekerja bergaji dalam bulan rujukan. Caruman Kumpulan Wang Simpanan Pekerja (KWSP) serta Pertubuhan Keselamatan Sosial (PERKESO) turut dimasukkan tetapi caruman oleh majikan dikecualikan. Elaun kepada pemilik yang bekerja, rakan niaga yang bekerja dan pekerja keluarga tidak bergaji, bayaran pampasan dan suguhati kerana pemberhentian adalah juga dikecualikan.

## 14. KEPERLUAN KERAHSIAAN

Survei ini dijalankan di bawah peruntukan Akta Perangkaan 1965 (Disemak 1989). Akta ini mensyaratkan bahawa kandungan penyata individu adalah SULIT. Selaras dengan peruntukan dalam Akta tersebut, hanya angka agregat akan diterbitkan.





#### 15. PINDAAN

Pindaan akan dibuat ke atas statistik yang telah diterbitkan berdasarkan data terkini yang diperolehi.

#### 16. PEMBUNDARAN

Perjumlahan komponen mungkin berbeza dengan angka jumlah besar disebabkan pembundaran.

#### 17. SIMBOL DAN SINGKATAN

Simbol-simbol berikut telah digunakan dalam keseluruhan penerbitan:-

t.t.t.l. : tidak terkelas di tempat lain

RM : Ringgit Malaysia

#### 18. PELARASAN MUSIM

Data siri masa adalah amat berguna untuk ahli ekonomi, pembuat dasar & keputusan serta penganalisis siri masa untuk mengenal pasti ciri-ciri penting siri ekonomi seperti arah aliran, *turning point* dan konsistensi antara penunjuk ekonomi yang lain. Kadangkala ciri ini sukar untuk diperhatikan kerana pergerakan bermusim. Oleh itu, sekiranya kesan bermusim boleh disingkirkan, arah aliran data siri ini dapat dilihat dengan lebih baik. Anggaran dan penyingkiran kesan bermusim dipanggil pelarasan bermusim.

Pelarasan bermusim adalah satu proses untuk mengenal pasti dan menyingkirkan bentuk pola bermusim yang biasa berlaku dalam tempoh satu tahun, yang mungkin juga merangkumi pengaruh dari kesan cuti yang bergerak dan hari bekerja/berdagang bagi suatu tempoh. Objektif utama proses ini adalah untuk menyerlahkan arah aliran dan pergerakan-pergerakan jangka pendek dalam siri ini.

Di Malaysia, kebanyakan data siri masa dipengaruhi oleh kesan bermusim. Oleh itu, untuk menghapus dan melaras kesan bermusim data siri masa ekonomi Malaysia, pakej standard pelarasan bermusim, X-12 ARIMA telah digunakan oleh Jabatan Perangkaan, Malaysia. Data siri masa ekonomi Malaysia juga kerap dipengaruhi oleh perayaan agama utama seperti Aidil Fitri bagi umat Islam, Tahun Baru Cina untuk kaum Cina dan Deepavali untuk kaum India. Tarikh perayaan-perayaan ini tetap mengikut tahun lunar tetapi berbeza-beza mengikut kalendar Gregorian. Oleh itu, untuk menganggar dan menyingkirkan kesan cuti yang bergerak dari data siri masa, satu prosedur telah dibangunkan iaitu *Seasonal Adjustment For Malaysia (SEAM)*.





## TECHNICAL NOTES

### 1. OBJECTIVE

The main objective of this publication is to provide statistics on the latest trend of main indicators in the Manufacturing sector, ie. **sales value, number of employees, salaries & wages** and **the production of main products manufactured** which is collected through Monthly Manufacturing Survey. This statistics assists users in policy formulation and decision making.

### 2. BENCHMARKING

After conducting the Economic Census 2016 (reference year 2015), Department of Statistics Malaysia (DOSM) has reviewed and carried out the benchmarking process towards the manufacturing statistics collected from the Monthly Manufacturing Survey. The benchmarking process is done to enable the series of values of annual estimates derived from short term survey consistent and match with the annual value from census/annual survey of the benchmark year. The benchmark process adapted the guideline of the Quarterly National Accounts Manual 2017 edition, International Monetary Fund to meet the objectives as follows:

- a. to estimate monthly data that are temporally consistent with the annual data: that is, to ensure that the sum of the monthly data is equal to the annual benchmark;
- b. to preserve as much as possible the monthly movements in the indicator under the restrictions provided by the annual data; and
- c. to ensure, for forward series, that the sum of the monthly of the current year is as close as possible to the unknown future annual data.

The benchmarking statistics is compiled on sales value, number of employees and salaries & wages and being published starting from January 2020. The base (benchmark) year using the Economic Census 2016 (reference year 2015) and pro rata and extrapolation method is used in the benchmarking process.

#### Pro rata Method:

$$M^iV = \frac{M^iI}{\sum_{i=1}^{12} M^iI} \times ADT$$

where

**M<sup>i</sup>V** = new derived monthly variables estimates

**M<sup>i</sup>I** = monthly indicator series

**ADT** = annual benchmark data

#### Extrapolation Method:

$$V_t = V_{t-1} * G_{t-1,t}$$

where

**V<sub>t</sub>** = value of variable

**G<sub>t-1,t</sub>** = growth from t-1 to t





### **3. SCOPE AND COVERAGE**

Data collected in the Monthly Manufacturing Survey covered the whole of Malaysia. Since January 2020, this publication presents weighted statistics which represent the population sample of 251 industries in Manufacturing sector. Data for industries with less than three establishments was combined to the closest industry to ensure the confidentiality of the respondents as stipulated under the Statistics Act 1965 (Revised-1989).

### **4. SOURCE OF FRAME**

The source of frame is from Malaysia Statistical Business Register (MSBR) where the main information is from census and survey conducted by the Department of Statistics Malaysia (DOSM) and administrative data. The main source of the administrative data is from the Companies Commission of Malaysia (CCM). In addition, DOSM also collaborates and yield information from over 50 other agencies such as the Employees Provident Fund (EPF), Royal Malaysian Customs Department (RMCD), Inland Revenue Board (IRB), Local Authorities and other Professional Bodies. The frame is updated continuously by taking into account of new establishments and to record any changes in the establishment status such as closed down, not in operation, change in types of activity and location or postal addresses to ensure that the information in the frame is at the most current status.

### **5. TYPE OF BUSINESS ACTIVITY**

Type of business activity is divided into primary and secondary. The primary activity refers to the activities which focus on its main resources and income. Secondary activities are defined as those incidental or ancillary to the primary activity. The classification of the establishment's industry is based on the primary activity and the Malaysia Standard Industrial Classification (MSIC 2008) Version 1.0 according to the International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4, United Nations, with modifications to suit local conditions.

### **6. CONCEPT AND DEFINITION**

Concepts and definitions used are in line with the manual of Recommendations for Industrial Statistics 2008, United Nations Statistics Division. The definition of manufacturing used in this survey is consistent with Malaysia Standard Industrial Classification (MSIC) 2008 Ver. 1.0.

Manufacturing is defined as the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail.





## 7. SAMPLING DESIGN

Sampling design of the survey is a one-stage stratified random sampling. The establishment is classified as sampling unit while a few categories of stratum was identified.

Each stratum has been set up to three substrata to ensure the distributed sample takes into account the economic characteristics of the stratum. The main substratum is heterogeneous and was fully covered. Whereas, other substratum that are homogeneous were sampled.

Main substratum include large establishments which have a significant total revenue in the respective industry while for the second and third substratum are based on small and medium enterprise (SME) categories.

## 8. SAMPLE SIZE

The main statistics used to estimate the sample size is the sales value. The formula used in the estimation of the sample size for a stratum is as follows:

$$n = \frac{(\sum N_i S_i)^2}{V + \sum N_i S_i^2}$$

where;

$n$  = Sample size

$N_i$  = Population size for stratum  $i$

$S_i^2$  = Variance for stratum  $i$

$V$  = Desired variance

$$V = RSE^2 \cdot \left( \frac{\hat{Y}_i}{Z} \right)^2$$

where;

$\hat{Y}_i$  = Estimated sales value for stratum

$RSE$  = Relative standard error

$Z$  = Value of confidence level

Sample is distributed to substratum of the industry using Neyman Allocation method as follows:

$$n_{hi} = \left( \frac{N_h S_h}{\sum N_h S_h} \right) n_i'$$

$h = 2, 3 \text{ and } 4$

$i = 1, 2, \dots k$





where;

$n_{hi}$  = Sample size for substratum  $h$  of stratum  $i$

$N_h$  = Population size for substratum  $h$

$S_h$  = Standard deviation for substratum  $h$

$n_i$  = Sample size for stratum  $i$

$h$  = Substratum

$i$  = Stratum

Establishments of the main substratum were fully covered while establishments of the second and third substratum were randomly selected using systematic random sampling.

## 9. WEIGHTED

Weighted analysis is done using sampling weight to ensure that the selected sample can reflect population survey. The weights required are the sampling design and non response weights.

The sampling design weight for the establishment at substratum  $h$  is as follows:

$$W_h = \frac{N_h}{n_h}, \quad h = 1, \dots, 4$$

where,

$N_h$  = Total population of substratum  $h$ ; and

$n_h$  = Total sample of substratum  $h$





Non response weight at substratum  $h$  as below:

$$NRW_h = \frac{1}{\frac{n'_h}{n_h}}, \quad h = 1, \dots, 4$$

where,

$n'_h$  = Number of response in sample size for substratum  $h$

$n_h$  = Number of sample size for substratum  $h$

The method of calculating the sampling design weight after the survey (adjusted weight) on substratum  $h$  as below:

$$W'_h = W_h \times NRW_h, \quad h = 1, \dots, 4$$

where,

$W_h$  = Sampling design weight at substratum  $h$

$NRW_h$  = Non response weight at substratum  $h$

## 10. REPORTING UNIT

The reporting unit used in the survey was the **establishment**. An establishment is defined as "an economic unit engaged in one activity, under a single legal entity and operating in a single physical location". Each establishment was assigned an industry classification based on its principal activity. In the case of a multi-activity entity, units engaged in separate activities in the same location constituted distinct establishments. Thus, each branch of a multi-branch organisation at a different location was conceptually treated as a different establishment. The establishment was requested to give separate returns for each activity in terms of value. However, if in practice, the accounts were centrally kept such that it was not possible to obtain separate data for each individual unit or branch. The entity or enterprise was treated as a single reporting unit and allowed to submit a consolidated questionnaire covering all the units or branches.





## **11. VALUE OF SALES**

The reported sales value refers to the sales value of their own products. This relates to sales of goods made on the reporting month, whether the products were produced/manufactured by the establishment during the month or in the other months previously. The sales value was net selling price (ex-factory) value relating to the quantity sold. The valuation price charged to customers were excluding:

- a. discounts or rebates;
- b. Charges for carriage outwards;
- c. commissions to selling agents;
- d. all other charges such as excise duties paid, sales tax collected by the factory on behalf of the government; and
- e. Installation, repairs and construction charges.

## **12. NUMBER OF PAID EMPLOYEES**

Number of paid employees cover as follows:

- a. Paid employees (full-time) - Refers to those who work for at least 6 hours a day and 20 days a month; and
- b. Paid employees (part-time) - Refers to all paid workers who work for less than 6 hours a day and/or less than 20 days a month.

## **13. SALARIES & WAGES PAID**

Salaries & wages paid refers to all cash payments, including bonuses, commissions, overtime wages, cost of living allowances and other allowances made to all employees during the reference month. The employees' contribution to Employees' Provident Fund (EPF) and Social Security Organisation (SOCSO) is included but the employer's contribution is excluded. Allowances to working proprietors, working partners and unpaid family workers and severance and termination pay are not included.

## **14. CONFIDENTIALITY REQUIRED**

The survey is conducted under the provisions of the Statistics Act 1965 (Revised-1989). The Act stipulates that the contents of individual returns are CONFIDENTIAL. In conformity with the stipulations of this Act, only aggregated figures are published.





#### **15. REVISIONS**

*Revisions will be made to the published figures based on the latest data available.*

#### **16. ROUNDING**

*The sum of the component figures may not tally with the sub-total or total figures due to rounding.*

#### **17. SYMBOLS AND ABBREVIATIONS**

*The following symbols have been used throughout the publication:-*

*n.e.c.: not elsewhere classified*

*RM : Malaysian Ringgit*

#### **18. SEASONAL ADJUSTMENT**

*Time-series data are very useful for economists, policy & decision makers and time-series analysts to identify the important features of economic series such as direction, turning point and consistency between other economic indicators. Sometimes this feature is difficult to observe because of seasonal movements. Thus, if the seasonal effect can be removed, the behaviour of the series would be better viewed. The estimation and removal of the seasonal effects is called seasonal adjustment.*

*Seasonal adjustment is a process to identify and to remove the regular within-a-year seasonal pattern, which may also include the influences of moving holidays and working/trading days effect in each period. The ultimate objective of the process is to highlight the underlying trends and short-term movements in the series.*

*In Malaysia, most of the time series data are affected by seasonal effects. Hence, to eliminate the seasonal effect as well as to seasonally adjust the Malaysian economic time series data, a standard seasonal adjustment package, X-12 ARIMA was used by Department of Statistics, Malaysia. Malaysian economic time series data also often affected by major religious festivals such as Eid-ul Fitr for Muslims, Chinese New Year to the Chinese and the Indian Deepavali. These festivals' dates are fixed according to the lunar year but vary according to the Gregorian calendar. Therefore, to estimate and remove moving holiday effect from time-series data, a procedure was developed, namely Seasonal Adjustment for Malaysia (SEAM).*

